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Famous First Facts

Pertaining to American Industries

By Joseph Nathan Kane

(We take pleasure in presenting this article, the first of a series dealing with "firsts" in the United States. Mr. Kane, a new member of the Association, is the author of "Famous First Facts," published by the H. W. Wilson Company, and his syndicated column, "Who Was First?" appears daily in several hundred newspapers. — Ed.)

The first person to conceive a new idea, or do something out of the ordinary, is often glorified to an extent altogether disproportionate to the event. Even in the most prosaic cases, historians often disagree as to the time, place, and participants of events. For example, one historian may place the date of an invention at the time when the idea was conceived, another when the first model was made, another when the patent was applied for, or even another at the time when the patent was granted.

The definition of terms is also an important factor to consider. What is a motorcycle? What is an automobile? Originally, the word "motorcycle" meant what is now known as an automobile, with the result that the dates given for motorcycles antedate the true date of what we term a motorcycle. The first automobile was invented by Charles E. Duryea, who drove his creation through the streets of Springfield, Mass., on September 12, 1892. If an automobile is a self-propelled vehicle, then Oliver Evans' curious contraption, the "Oruktor Amphibolos" may be called an automobile, unless greater regard is taken of terminology. Again, we are in dispute about such words as "practical," "successful" and "modern." If the average life of a glass factory were five years, would you call a factory that weathered the storm for fifty years, to eventually fall under the hammer of the auctioneer, a successful factory? Until a better standardization of words come into use, we are obliged to use their commonly accepted meanings, and to amplify thoughts with qualifying statements. Facing this problem is often a difficult task, and one fraught with dangers to the historian. Nevertheless, "firsts" can be ascertained, and a general list of "firsts" in the United States follows:

The first *apple parer* was invented on February 14, 1803, by Moses Coats, a mechanic of Dowingtown, Pa.

The first *arctics* were patented on February 2, 1858, by Thomas Crane Wales, and were originally known as "Wales Patent Arctic Gaiter." They were made then, as now, of rubber and cloth, and were both water-proof and cold-proof.

The first *baby carriage* patent was granted to Anthony Clifford, on October 27, 1829. As the early patent records have been destroyed by fire, it is not certain whether the patentee's resi-

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Our Purpose

The purpose of the association is to encourage the study and better understanding of early American industry, in the home, in the shop, on the farm, and on the sea, and especially to discover, identify, classify, preserve and exhibit obsolete tools, implements, utensils, instruments, vehicles, appliances and mechanical devices used by American craftsmen, farmers, housewives, mariners, professional men and other workers.

Dues

The annual dues are one dollar, payable September first, for the year immediately ensuing. *The Chronicle* for the current year is sent to all members without additional charge. Back numbers (except No. 1) may be secured from the Treasurer for 20c each. For further information, address any of the officers. See page 5.

The Gold Beater

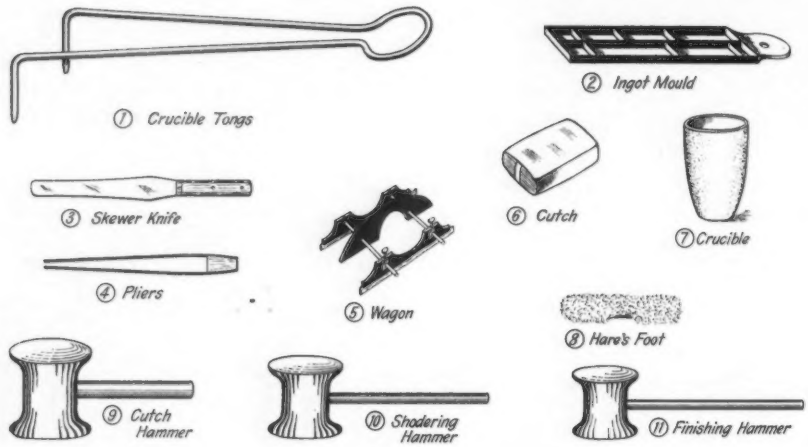
By William B. Sprague

(The capital letters interspersed through the text refer to the authorities listed at the end of the article.)

So far as can be ascertained, from time immemorial the application of gold leaf has been the only means known to man (disregarding modern gold paint) for *gilding* articles of "wood, iron, copper, steel and other materials" (B), and the leaf has always, up to and including modern times, been produced by pounding gold, nearly one hundred per cent pure, with an iron hammer upon a stone anvil. Silver, copper and platinum may also be thus formed into leaves, but not of such excessive thinness (E, G, H, I,).

The craft is a very ancient one. Gilt objects, including mummy cases and even the mummies themselves, have been found in Egyptian tombs which are dated by archaeologists prior to 1700 B. C. In the 10th century B. C., Homer refers to articles thus decorated, and the Temple of Solomon, of the same period, was profusely gilt. (A).

As to the exact method used by the ancients, no account is available, but there is little doubt that they were much the same as those of today, even though less efficient, the improvements "being more the result of patience and skill than of science or civilization" (I). Pliny (c. 50 A.D.) makes the earliest reference to the beating process, stating that an ounce of gold could be beaten into 750 leaves, four fingers square (A, D). About 1621, Marunne, a Frenchman, showed that an ounce could be spread to a total area of 105 square feet (A), and in 1850, it was stated that an ounce would produce 160 square feet of leaf, but that "such leaves would not be satisfactory." (G). The thinness of the finished leaf seems to have progressed from 1/150,000 of an inch in 1814 (E), to 1/240,000 in 1827 (B). to 1/290,000 in 1852 (H), to 1/367,-



GOLD BEATER'S EQUIPMENT

000 in 1931 (J), thus "rendering tangible a space which is invisible" (I). An 1820 writer claimed that an ounce of gold leaf would cover 1300 miles of silver wire (C). The trade is said to have been introduced into this country about the year 1815.

Before proceeding to beat the gold, it is often deemed advisable to introduce an alloy, usually about 1¼ % of silver or copper (A, D,), the former lightening, and the latter darkening, the color of the leaf (I, J,). The gold is melted, with the alloy metal, in a crucible (B, D, G, H,) usually made of black lead (E, I,), the crucibles being handled, in recent years at least, with a pair of iron tongs (Fig. 1), the ends being bent at right angles to the handle (J). After introducing a little borax (B,D,G,H,) to facilitate the flow (K), the molten metal is poured into a cast iron mould (B, D, E, H,), which has been previously heated and greased (E, G,), "with linseed oil or tallow, to drive off moisture and promote an easy separation" (I). This mould has a somewhat concave inner surface "to compensate for the greater contraction of the central parts of the metal in cooling than the edges"(G, I,). The ingots thus formed are three quarters of an inch wide (G, H, I,) and vary from 6 to 8 inches (E) to 3 or 4 inches (I) in length. The moulds of modern times have compartments for producing ingots of several different sizes (Fig. 2), according to the quantity of gold which is to be beaten at any particular time (K).

The ingot, after being taken from the mould, is forged into a long, thin plate (B, D, E, G,), upon an ordinary smith's anvil, with any kind of flat-faced hammer of medium weight (K). After being heated in an open fire (G, I,) or a small furnace (I), this plate is then passed repeatedly between the polished rollers (B, D, E, G,) of a machine called a *flatting mill* (C, I), being frequently annealed—i.e. heated and cooled — to prevent brittleness (B, C, H, I,). This process, called *laminating* (G, H, I,) or *flatting* (K), produces a ribbon of gold, one inch wide (I) and from 1/700 of an inch (I) to 1/1000 of an inch thick (J). See Hazen's picture. Comparatively few gold beaters have the facilities for performing the foregoing processes, but take their gold to those who have, to have it flattened (J, K,). The ribbon is next laid off with dividers (I), as extreme accuracy is necessary (K), and cut with ordinary shears (K) into one-inch squares (G, I).

"In further extending these pieces into fine leaves it is necessary to interpose some smooth body between them and the hammer for softening the blow, and defending them from the rudeness of its immediate action; as also to place between every two of them some proper intermedium, which, while it prevents them from uniting together or injuring one another, may suffer them freely to extend" (B). The German monk Theophilus, in the 9th century A. D., speaks of protecting the gold with parchment, during the beating (I), and it is here that the *cutch* (E, J) or *kutch* (H, I) comes into play (Fig. 6). This consists of about 200 four-inch squares of vellum (A, C,) made of calf skin (B), covered with a jacket of parchment made of sheepskin (B, D, E), the parchment being selected for softness and uniformity of thickness (I). There are two parts to the parchment jacket, one of them a belt or band, open at the sides, fitting tightly around the packet of vellum leaves, and the other a square case, open only on one side, which is drawn over the first part at right angles, so as to cover its open sides (G, H, I,). The number of leaves in the packet is, at least in recent years, referred to as the *tale* (J). About 150 of the one-inch squares of gold ribbon are now interspersed between the leaves of vellum (G, H), being laid with "wooden pliers" (H, Fig. 4) at the centre of each leaf (G, H,), except that about twenty leaves at the top and bottom of the pile are not thus covered (B, D, E, G), and the parchment jacket drawn on.

The three hammers of the gold beater vary principally in size and weight (Fig. 9, 10, 11). Each has two faces, but "seldom more than one is used" (B). These faces are all slightly convex (B, C, E, G), the degree of convexity increasing as the weight diminishes (I). The first is called the *commencing hammer* (A, D), *cutch hammer* (E) *catch hammer* (B, C), or *first close hammer* (K), weighing about sixteen pounds (A, B, D, E). The second is known as the *spreading hammer* (A) *shodering hammer* (B), *shoddering hammer* (E), or *second close hammer* (K), ranging from nine to twelve pounds, and the third, *finishing hammer* (B, C, D, K) or *gold hammer* (E) weighs from six to ten pounds (A, B, C, D,). The anvil consists of a smooth block of marble, fitted into the middle of a wooden frame, which forms a high rim at the back and sides of the block (B, C, H, I), sometimes called the *hull* (K). At the front is fastened a leather flap which the workman "takes into his lap as an apron" to catch stray fragments (B, C, H, I). The marble block is about nine inches square (C.

From Hazen's *Trades* (D)

(*Continued on page 7, column 3*)

First Porcelain Making in America

By G. A. R. Goyle

(*Continued from last issue*)

This document is filed in the City Hall at Philadelphia (recorded in Deed Book *R*, page 109, and the original will with an inventory, filed as item No. 112), and augments our information about Andrew Duché. The funeral was to be "as private as possible without great pomp and shew." The executors named were Andrew Doz, a relative, (Duché's mother was a Doz), Edward Duffield (one of the executors of Benjamin Franklin), and Benjamin Wynkoop. After Andrew Duché's death in September, 1778, Andrew Doz rendered a true inventory of the decedent's goods, the other two executors declining to serve. The total value of the inventory amounted to £2516/12/4, not including the town house on the south side of Union Street, in Philadelphia, and other real estate in Virginia and Georgia. The latter possessions are of especial interest to us. The information that Andrew Duché left a lot of land in the town of Norfolk in Virginia "on which I formerly lived," proves a residence there, perhaps of many years, in the interval from 1746 to 1774, when he again appears as a resident of Philadelphia. His holdings in Georgia he also still retained until his death, and they were the original grants made to him before 1740:— "one hundred acres of land in Georgia consisting of four pieces, two lots of forty-five acres each, and two lots of 5 acres each, also two town lots in the town of Savannah in Georgia aforesaid." Knowing of Duché's interest in porcelain and pottery, the amount of it listed in the inventory is worth quoting. They were the following:

6 China high cup & saucers	4/10/-
6 large ditto cup & 5 saucers	4/-/-
6 China Bowls half pints & saucers	6/-/-
20 Queen's Ware Plates	10/-/-
6 blue & white China plates	6/-/-
2 quart China Bowls & one nip	5/-/-
9 Queen's ware tea potts	3/7/6
3 China butter boats	-/15/-
6 Queen's ware bowls	1/10/-

Of potter's tools there were none to tell a tale, for Andrew Duché had been a "Gentleman" for too many years. His early determination that, for the good of Georgia, he would not rest until he saw the use of negroes granted (they were finally granted in 1750), is also reflected in his will. A child of his time, he believed in slavery, and among the valued possessions in the inventory appears an item, the most expensive single item: "A negro wench, fifty lbs." Diana was her name,—a likely wench, to be valued at fifty pounds,—and she was left to the nephew, Swanson Duché. The original will bears the shaky signature of Andrew Duché and an interesting black seal beside it. On it a crest is emblazoned,—two martlets respectant above a supporting bar, and surmounted by a coronet. Andrew Duché seems to have been proud of his noble descent, for he had not only one seal, but three, in his possession, and, at that, they were of solid silver, as we also learn from the inventory.

All of the interesting and valuable pieces of porcelain and pottery, listed above, were left to Andrew Duché's nephews and nieces, and we may well wonder what subsequently became of them. Were they some of Duché's own making, some of the very samples that he had made in Georgia, and had proudly carried to London to convince people there that he had discovered the china earth and the making of porcelain? Who can tell?

Now we must turn to inquire into the significance of Andrew Duché's pioneer work in Georgia in regard to porcelain making. The secret of Chinese porcelain is a proper mixture of China clay (kaolin), an infusible ingredient, with feldspar (petunse) which is fusible. If China clay alone were burned, it would sinter and result in a porous mass. The admixture, however, of feldspar, the fusible material, fills all the pores and the result is a vitreous mass, no longer porous, but compact, sonorous and translucent. The latter property was, by the early experimenters in Europe, considered the main *desideratum*, and early records stress that point. So we have a notice that John Dwight, on April 23, 1671, took out a patent in England for the manufacture of "porcelain," or "*transparent* earthenware." If we knew more about his process, especially whether he produced such ware at all beyond the experimental stage, we might have to concede to him the honor to be the first inventor of porcelain in England.

Andrew Duché was a potter, a master of his craft. He had learned his trade in Philadelphia, no doubt from his father, Anthony Duché, Sr. The venture of Dr. Cox to make white ware, as early as 1685, somewhere between Burlington and Trenton, N. J., could not have escaped his knowledge, and, as a skilled potter, Duché was quite aware that a white clay was necessary to make white ware. In Georgia, he did find white clay, and General Oglethorpe attests to this fact when he reports to the trustees in London, in 1738: "that earth is found which Duché the potter has baked into China ware." Stephens' testimony to the performances of Andrew Duché is the more valuable, as he was by no means a friend of the latter. He never could forget their political differences, and his praise is mostly tempered by that fact, as when he says, in November, 1740: "Andrew Duché, the Potter, who if he would stick to his own business, we are willing to allow is a master of that trade." On May 28, 1741, Stephens reports: "It began to be currently reported about town, that Mr. Duché, the potter, had now accomplished his Intention of making China Ware; that he had baked several cups and basons, which were transparent, and was no longer in any doubt of bringing it to Perfection." In June, 1741, Duché visited Stephens and told him of the progress he had made in bringing his China ware to perfection, and invited him to call at his pottery and see for himself what progress had been made. Stephens did accept the invitation, but arrived at an inopportune time. Under date of June 17, 1741, he writes about it as follows: "I took occasion to call on Mr. Duché, to see some of his rarities, as I had before promised him; but it happened not to be at a right season, for his kiln was now burning; and from what he told me, I understood all his fine ware was baking a second time, as it ought to be, with proper glazing: but he shewed me a little piece, in form of a tea-cup, with its bottom broke out, which he said he had passed through one baking, and was yet rough; but upon holding it to the light, as it was without any coloring on it, I thought it as transparent as our ordinary strong China Cups commonly are." The second burning must have been successful, but, instead of showing the samples to Stephens, Andrew Duché went to Frederica and submitted them to General Oglethorpe.

(*Continued in next issue*)

First Facts

(*Continued from page 1, column 2*)

dence was at West Point, N. Y., or Westport Point, Mass.

The first *belt conveyor system* is described by Oliver Evans in "THE MILLERS GUIDE," published in Philadelphia, Pa., in 1795. It illustrated a flat belt, receiving material on the upper run, and discharging it over the end, on a broad endless strap of thin pliant leather or canvas, revolving over two pulleys in a case or trough.

The first *blowpipe* was invented, in 1801, by Professor Robert Hare, of Philadelphia, Pa., who called it a "hydrostatic blowpipe." Hare obtained a patent on the blowpipe on July 25, 1841, — No. 4,104. The American Academy of Arts and Sciences awarded him the Rumford medal for this invention.

The first *brass* was rolled, in 1802, by Abel Porter & Company of Waterbury, Conn. The factory was owned by Abel Porter and Levi Porter, who were also the first to make brass by the direct fusion of copper and zinc.

The first *brass and copper seamless tubes* were manufactured, in 1851, by the American Tube Works, at Somerville, Mass. The process was introduced by Joseph Fox. Previously, strips of rounded metal with brazed edges were used.

The first *cable car* was invented by E. A. Gardner. It was patented March 28, 1858,—No. 19,736.

The first *calliope* was invented by Joshua C. Stoddard, who, on October 9, 1855, received U. S. patent No. 13,368. The calliope was used on many of the Mississippi steamboats in 1856, and was very popular.

The first *celluloid* was invented by John Wesley Hyatt, who obtained U. S. patent No. 91,341 on June 15, 1869. His invention won a $10,000 prize, offered by Phelan & Collender, of New York City, for a substitute for ivory in billiard balls. He molded together pyroxylin, with half its weight of camphor, under alcohol, and then subjected the mixture to heat and pressure in molds. He began manufacturing it in 1872, organizing the Newark Celluloid Manufacturing Company, and obtained United States Trade-Mark registration No. 1102, on January 14, 1873, on the word "celluloid," which he derived from the combination of cellulose and "oid," meaning like.

The first *ceramic school* was started by Ohio State University, Columbus, Ohio, in 1894, under the guidance and direction of Professor Edward Orton, Jr.

The first *chewing gum* patent was No. 98,304, obtained December 28, 1869, by William F. Semple, of Mount Vernon, Ohio, who claimed the "combination of rubber with other articles, in any proportions, adapted to the formation of an acceptable chewing gum."

The first *cigar lighter* patent was No. 121,049, granted to Moses F. Gale, of New York City, on November 21, 1871.

The first *cigarette manufacturing machine* was the Hook machine, which was invented in 1872, but which did not come into practical commercial use until 1882. As late as 1875, only fifty million cigarettes were made annually, according to revenue collection figures. The Hook machine was granted patent No. 184,207, on November 7, 1876. It produced a continuous cigarette of indefinite length (to be cut into separate cigarettes) in which tobacco was fed to a ribbon of paper as it was drawn from a spool, the edges passing over a gummed wheel.

The first *clock* to strike the hours was constructed, in 1754, by Benjamin Banneker, a negro. At the age of twenty-three, without tools and using only a jack knife, and without ever having seen anything similar but a sun dial and a watch, he constructed this clock which kept time for more than twenty years. Banneker later became distinguished as a scientist.

The first *confectionary machine* for making "suckers," more familiarly known by the trade name "lollipops," (supposed to be an exclusive name used by the Bradley-Smith Company of New Haven, Conn.) was manufactured by the Racine Automatic Sucker Machine Co., Racine, Wis., in 1908. Its capacity at that time was forty suckers a minute, which manufacturers felt would make more suckers in a week than they could sell in a year.

The first *copper mine* known to have been worked was the Simsbury mine at Granby, Conn., whose history dates back to 1705. A company to mine the ore was formed, in 1709, by John Winthrop, the younger, and was the first mining company chartered. The mine was also known as the Granby mine, and was worked for several years by convicts of the Newgate prison established there. In 1737, the copper obtained from this mine was used in the manufacture of the "Granby coppers," among the earliest Colonial coins minted. The mine was worked spasmodically until 1773.

The first *cork* for steam pipe covering was manufactured, in 1894, by Stone & Duryea of Brooklyn, N. Y. They moved to Bridgeport, Conn., in 1896, and in the following year, produced cork covering for cold lines. They were succeeded by the Nonpareil Cork Manufacturing Company, which in turn was purchased by the Armstrong Cork Company in 1904.

The first *corkscrew* patent was No. 27,615, granted March 27, 1860, to P. Blake of New Haven, Conn.

The first *cutlery factory* for the manufacture of pocket cutlery was started at Lakeville, Conn., by the Holley Manufacturing Company, in 1845.

The first dental patent for *artificial teeth* was granted to Charles M. Graham, of New York, on March 9, 1822.

The first *diamonds* in actual rock, peridotite, were found in the United States in the matrix, at Murfreesboro, Pike County, Ark. in 1906.

The first *envelope*, known as the outlook or window envelope, was patented, by Thomas Callahan, on June 10, 1902. It was first manufactured in July, 1902, by the U. S. Envelope Company of Springfield, Mass., to whom the patent was leased.

The first *eyeglasses* known as bifocals were invented by Benjamin Franklin, who, annoyed at having to carry two pairs of glasses, had one pair split in half, each eye having two different lenses. In a letter dated May 23, 1785, he wrote, "I only have to move my eyes up and down as I want to see distinctly far or near." Inasmuch as ordinary spectacles in the colonies cost as much as $100. each, his invention did not receive a ready popular response.

The first *fire alarm electric system* was invented by William Francis Channing and Moses Gerrish Farmer, who, on May 19, 1857, received patent No. 17,355 for "a magnetic electric fire-alarm." The first city to adopt this system was Boston, which, in June, 1851, voted $10,000, with which to test the device.

The first *gem-cutting machine* (or lapidary) was invented by Abel Buell, of Killingworth, Conn., in 1766. He claimed that his "method of grinding and polishing crystals and other stones of great value, all the growth of the Colony" would effect a great saving in money.

The first *genealogy* of an American family was published at Hartford, Conn., in 1771. It was the "Genealogy of Mr. Samuel Stebbins and his Wife, from the Year 1707 to 1771."

(*To be continued from time to time*)

Early American Industries Association

Early American Industries Association

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W. B. Sprague, *Editor.*

Editorial

Whatever your collection is, you will do well to make a careful inventory of it, noting the date on which you acquired each item, the original source from which it came so far as can be determined, what it cost you, and as complete a description of it as possible. Not only is it interesting to look back after several years, and refresh your memory about these details, but much more practical considerations are involved. If you sustain any kind of loss which is covered by insurance, you will find your path much smoother in recovering what you are entitled to, if you are able to file an exact list of the items in question, than if you rely on your own memory to tell you just what you have lost, and ask the insurance company to accept your guess as to value. Furthermore, if it should ever become necessary to dispose of your collection, after your death or in your absence, any notes which you have made of the particularly interesting features of any item should very naturally enhance its salability. A "what-is-it" never brings as much as an article of which the name and purpose is reasonably well established.

Literary Contributions

Especially for the benefit of the many new members who have recently joined the Association, we repeat that we welcome literary contributions from everyone. If you do not care to undertake the preparation of a long and weighty article, write a few hundred words on any subject pertaining to early American industries which especially interests you, or send us excerpts from early books or pamphlets which may not be available to other members, or even write us a short letter suitable for publication under the heading "Communications." Fortunately, the editor has thus far not lacked for cooperation and assistance from several gifted writers, but all will agree that The Chronicle will make a much stronger appeal to its readers if its contents are greatly diversified, rather than limited to the offerings of a comparatively small group.

The Antiques Show

Through the courtesy of the management of the Sixth International Antiques Exposition, of which the executive head is Mr. George W. Harper, and which will be held at the Hotel Commodore, New York, April 8th to 13th, the Association has been offered, without expense of any kind, a booth in which to make a display for the purpose of attracting public interest and new members. Mr. Lewis N. Wiggins, of Wiggins' Old Tavern, Northampton, Mass., has again kindly agreed to have us draw upon his wonderful collection for the necessary material. At the same show last fall, we secured over seventy new members, but to accomplish anything along this line, it is essential that there be someone in attendance at the booth at all times to explain the general purposes of the Association. Everyone who is willing to serve in this capacity for a morning, afternoon or evening, is earnestly urged to communicate with W. B. Sprague, 43 Cedar Street, New York, indicating how much time he or she is willing to give and what times would be preferred.

In 1839, Charles Goodyear discovered the process of vulcanizing India-rubber. He was described by his contemporaries as "a man who wore an India-rubber coat, India-rubber shoes, an India-rubber cap, and in his pocket an India-rubber purse, and not a cent in it."

New York Meeting

On the evening of March 8th, about forty of our members and their friends gathered at Harry S. Newman's Old Print Shop, at 150 Lexington Avenue, New York. The arrangements were in charge of a committee which has been appointed to manage these local entertainments, consisting of George S. McKearin, chairman, Homer E. Keyes, Harry S. Newman, Thomas H. Ormsbee, William B. Sprague, and Charles Messer Stow. As previously announced, there was no formal program of speaking, but the meeting was called to order for a few minutes, and members were invited to express their opinions as to what plans should be followed on future occasions. The sentiment appeared to be unanimous that these gatherings should remain entirely informal in character, and be primarily designed to bring about a closer personal acquaintance between the members, but Mr. Keyes' suggestion of an occasional "clinic" (a short talk, with opportunity for questions and debate) was received with great favor. It was also thought that many members would bring easily portable articles, upon which they might wish to procure the opinions of others. After the meeting, those present broke up into several groups, with constantly shifting personnel, enjoyed the excellent refreshments which had been provided, and participated in lively and interesting discussions until a late hour. As to future meetings, all members of the Association, as well as their friends, are cordially invited to attend, but all who wish to receive personal notices of them must so advise the committee, preferably Mr. McKearin (80 Maiden Lane) or Mr. Sprague (43 Cedar Street), unless they have already done so.

Lighting Articles

To reassure those who are especially interested in lighting devices, we are glad to say that the suspension of Dr. Rushford's series of excellent articles is only temporary. The doctor tells us that pressure of professional and personal matters has very closely limited his writing time for the past few months, but that he hopes soon to resume, — possibly in the next issue. It is most satisfactory to know that we shall be able to draw on his practically inexhaustible wealth of information for an indefinite period.

Drills and Drilling Methods

By L. L. Thwing

(Continued from last issue)

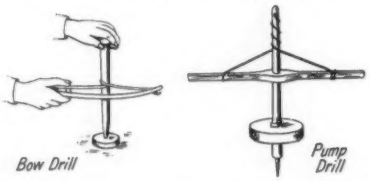
The auger is probably the most important of all wood drills. Moxon says of it: (spelled "augre") "Its Office is to make great round holes . . . it cuts great chips out of the stuff." On account of its importance, there are many varieties, and much that can be said about them applies to gimlets as well. Augers may be divided into five groups: end-cutting, side-cutting, compressing, trepanning and combinations. A machinist's drill is an end-cutter, a reamer is a side-cutter, an awl is a compressing tool, a washer cutter and the two outside cutters on a modern auger are trepanning tools. Any tapered auger or reamer is a combination of end and side cut.

Following Mercer's nomenclature, there are cylinder, gouge, spoon, pod, nose and duckbill augers. These are sometimes twisted, but usually they are not. They may have a tapered screw at the end to center the auger and help force it into the work.

Other augers, more properly reamers, have a hook at the lower end, to which an assistant could attach a thong and pull. This means that a small hole would have to be bored first. There are several advantages to a twisted auger. It tends to fill a hole and so travel in a straight line; it gives a shearing cut to the side cutters, and tends to remove the chips.

A true cylinder auger seems to have been a 14th to 17th century tool. Essentially, it was apparently much like a piece of pipe, cut off at a sharp angle with the axis. (See "Ancient Carpenter's Tools," by Henry C. Mercer, page 183.) A gouge auger is like a carpenter's gouge. At the end it may be bevelled, half on the inside and half on the outside, or all on the inside. This would really be a sort of trepanning tool, or core drill. The true spoon auger, which is a very old type, was truly spoon shaped. Those illustrated by de Caus, in 1615, have a hook at the lower end. Pod augers are long half cylindrical spoon augers. At the cutting end they vary, some being simply a hollow half spheroid, others having this end partly cut away and slightly bent outward, to give a better end cut. The one illustrated by Dr. Mercer (page 185) is somewhat flattened on the end. Dr. Mercer calls them down-cutting or nose augers. He describes the Duck's Bill (Duck's Nose, Brush Bit, Cooper's Dowel Bit) as a spoon bit, in which the spoon ends in a "side sharpened upcurled point, * * which * * would, * * because of its cross reach beyond the center of the hole, catch and pull out shavings that the plain spoon (or pod) would miss."

The center bit, when used for holes an inch or two deep, is a very satisfactory tool. It has one annular cutter, which scores the circumference of the hole, and a single horizontal cutter, which follows it and lifts the chip. The center pin steadies the cut, by acting as an axis for the two above cutting edges. It is not adapted for long holes, as it has no side support to insure a straight hole, nor has it any spiral to lift out the chips. Within the above limits, it was the most efficient bit in the carpenter's chest, until quite recently. Dr. Mercer quotes Blumner, as believing that this tool was invented by the Romans. Whether this is true or not, there is no trace of its



use until the 19th century. Plumier (1701) does not mention it, nor does Moxon. This, however, is inconclusive, and it may indeed be as old as the Roman empire. If it is, the broad hint which it gave to those inventors who later developed the modern auger, was not noticed for over a thousand years.

The history of the modern carpenter's bit or auger is somewhat obscure. This tool combines two trepanning cutters, which cut around the circumference of the hole, just ahead of the two horizontal end-cutting thin-edged knives. The tapered screw centers the tool, and draws it into the work. The outside diameter is uniform, and keeps the hole straight. Being twisted, a helical space is left for the discharge of the chips. The circumference cutters seem to be the most modern part of the tool. These cutters, or one of them, appears on the center bit, which is apparently older than the Colonial auger. (I would be interested in any comments on this conjecture). The auger is, then, a combination of the center bit, that may not be over a hundred years old, a spirally twisted body, a thousand years old, and the spiral end screw, which may be nearly as old. The first spiral auger appeared prior to 1772, and was invented by P. Cooke in England. The end was rounded into two half gouge or pod bits, oppositely faced so that both would cut. It had a tapered end screw. The fact that this was invented in 1770 does not necessarily mean that it came into use immediately afterward. Evidence *pro* or *con* is lacking. In any event, this idea, if not Cooke's, seems to have been the foundation to which the center bit idea was adapted, to build up the modern auger. The chronology and personnel of this development is unknown to the writer. A search of the United States patent records reveals nothing more than the general nature of the patent, as the specifications were destroyed in the fire of 1836.

The first Colonial augers, consciously or otherwise, were similar to Cooke's. The next step was to flatten the bottom of the spoon end-cutters. This type is very common in any carpenter's chest, seventy-five to a hundred years old. Then someone, possibly Lilley and Gurley of Connecticut (*circa* 1800), Hoxie, Hale, or L'Hommedieu, during the next decade, added the two important annular or trepanning cutters, and, except for minor improvements, the auger has remained unchanged.

There is one other group of boring tools, namely the reamer. This tool is used to enlarge a previously drilled hole, and is apparently very old. The oldest type, which is still used for certain purposes, such as reaming bung holes, is simply a hollow half cone, sharpened on the edges. Some of the smaller ones have a tapered screw at the small end, while the largest sizes have a hook to which a thong or chain could be attached for the apprentice to pull on. All common reamers for wood are tapered, but reamers (old spelling, "rimmers") for metals have parallel cutting edges.

The history of drills for metals and devices for operating them is a story in itself, a story for which there is very little data. We know how cannon were bored in the 16th century. The contemporary small arms were also bored, but, until the 18th century, we have no details. Here is an untouched field for future research.

The Moravian settlement Bethlehem in Pennsylvania, in 1747, six years after its founding, could boast of having about fifty different trades plied within its precincts.

Early American Industries Association

New Members

Please check your name and address and advise Mr. Goodnow of any corrections. The total membership is now 435.

Mrs. Alice R. Andrews, *Winchester, Mass.*
Raymond A. Beardslee, *Springfield, Vt.*
Howard Biddulph, *Bloomfield, N. J.*
H. H. Biggert, *Racine, Wis.*
Mrs. Alexander C. Birnie, *Ludlow, Mass.*
John Burk, *Binghamton, N. Y.*
George R. Cope, *West Chester, Pa.*
J. B. Crosman, *Walpole, Mass.*
A. Jay Devendorf, *Amsterdam, N. Y.*
Melvin C. Dow, *Newburgh, N. Y.*
Mrs. Carroll A. Edsall, *Brooklyn, N. Y.*
Stephen S. C. Ensko, *New York, N. Y.*
Mrs. Stephen S. C. Ensko, *New York, N. Y.*
Mrs. Mary E. Gould, *Worcester, Mass.*
Earle Gray, *Chicago, Ill.*
Robert C. Harley, *Brooklyn, N. Y.*
George W. Harper, *New York, N. Y.*
Mrs. Mary M. H. Hepburn, *Locust Valley, N. Y.*
Miss Florence E. House, *New York, N. Y.*
Mrs. M. H. Jewell, *Portland, Me.*
Joseph Nathan Kane, *New York, N. Y.*
Charles S. Livingstone, *Winchester, Mass.*
Hiram Merriman, *New York, N. Y.*
Albert E. Noelte, *Pawtucket, R. I.*
Mrs. Nettie W. Park, *Hillsdale, N. J.*
Miss Mildred K. Pike, *New York, N. Y.*
Dr. Henry Pleasants, Jr., *West Chester, Pa.*
H. F. Reilly, Providence, R. I.
Lawrence B. Romaine, *Middleboro, Mass.*
Louis Rottman, *Fond du Lac, Wis.*
Robert Sinclair, *Hampton, Va.*
Mrs. Edward L. Singsen, *Rumford, R. I.*
George H. Sinnott, *St. Louis, Mo.*
Mrs. Grace L. Stammers, *Watertown, Mass.*
Thomas S. Taylor, *Bridgeport, Conn.*
Mrs. Murphy Townsend, *Dallas, Texas.*
James E. Whitney, *Newburyport, Mass.*
James Whitton, *Chatham, N. J.*

We learn from the New York *Sun* that the Carnegie Institution has provided funds for the maintenance of the museum at Riverdale, N. Y., established by our member, Mrs. Elie Nadelman, and her husband. It will be open to the public on Saturdays and Sundays. The *Sun* says, "There is nothing like it in America, for it offers a survey of primitive implements, not only of America but of European countries as well, giving a chance for comparison that can be found nowhere else. It represents a life work on the part of Mr. Nadelman and his wife, a work which had as its inspiration an attempt to instruct this age in the beauty inherent in utility."

Mr. Raymond A. Beardslee, 41 Wall Street, Springfield, Vermont, a newly-joined member, is willing to have his name added to the list published in our number 6, as a collector who will welcome visits from other members, by previous appointment.

Museum Notes

Through the courtesy of Mr. W. W. Taylor, we are able to give the following brief descriptions of some of the exhibits at the Edison Institute, Dearborn, Mich., which would be most interesting to the collector of tools and implements.

Blacksmith Shop. — In a corner of the main exhibition hall stands the historic Caleb Taft blacksmith shop from Uxbridge, Massachusetts, with its famous forge, said to be the second oldest in America. It contains one of the few remaining slings in which an ox was fastened and then revolved by pulleys to put the yoke in position so that the smith could shoe the beast. The poet Longfellow knew this shop and occasionally visited it. Other articles of equipment include a wooden frame forge with hand-operated bellows; benches for nail makers; a stone-weight, hand-operated drill believed to be the first type of pressure drill.

Candle Shop. — In this shop are illustrated the two most common methods of making candles, the dip and the mould. Two types of dips are shown, the one in the corner being built like a scale with weights to balance the candles and regulate the size, and the one in the center of the shop representing an original of the rotary type. Candle moulds are shown on the work-benches, along with other examples of candle-making equipment. Several original tallow caldrons are in this shop.

Pewter Shop. — In the corner is a caldron for melting the alloy. Near by is the foot-power lathe for burnishing. About the shop are plate and spoon molds of bronze. The pewter on display in the window and on the shelves along the side wall is of the last period of its general use. (1800-1850).

Wood Turner's Shop. — In this shop have been assembled various types of lathes and other wood-turning equipment. In one corner is a *spring pole lathe* of early form. The large overhead-drive foot lathe did the heavy work, such as turning bed posts. The "great wheel," or man-power lathe, was used, up to the development of steam power. The wheel, which was turned by an apprentice, was equipped with cranks of different lengths to accommodate it to the power needed for the work being done on the lathe. On the work-bench are shown a *two-motion* (or *rise-and-fall*) wood drill, hewing hatchets, a frow, and frow mallet.

Pottery Works. — From Exeter, New Hampshire, 1817 — Equipment used in making earthenware is shown in this shop. On the two *kick wheels*, which have been restored, are pots in process of being moulded. In one corner is a *lead mill* for grinding red lead used in glazing the sides of the clay pots. A number of hand-made pots are displayed on the shelves.

Carpenter Shop. — Along the aisle are early tools — a frame saw dating back to the 17th Century; and two long rabbet planes. Inside, the visitor will note such tools as the old wooden mallets, hammers, planes, saws, foot-powered buzz saws.

Tinsmith. — This shop is modeled after a famous one conducted by J. B. Sweet, at Pittsfield, New Hampshire. It is equipped with tools to turn out almost any article in small tinware; specimens of the craft are also shown. On the floor in the rear is a stove-pipe anvil.

The Gold Beater

(*Continued from page 2, column 3*)

G, I) and weighs from 200 to 600 pounds (B, C, H, I)"the heavier the better" (D). It often rests on a wooden block set three feet into the ground to provide a resilient base (J), but some dispense with this block, which is liable to rot out, and set the stone on the surface of the ground (K).

From early illustrations it is apparent that the beater sometimes stood and sometimes sat at his work. Holding the gold-filled cutch upon the anvil with one hand, he pounds it with the enormously heavy commencing hammer, placing it in a different position between each blow, and occasionally turning it over (B, D, E, I), but "never intermits striking, so that this is done in the interval between strokes" (C, G). "From practice he shifts hands; and, if the expression may be used, keeps time notwithstanding" (C, I, J). The hammer comes up to about shoulder level between strokes, which are delivered at the rate of about fifty to the minute, and the head and shoulders of the beater move in unison with his arm (K). The hammer face, being convex, "strikes the center of the packet most forcibly, and thus squeezes out the plates (of gold) laterally" (G). The heat generated by the beating is an important factor in causing the gold to "move." (K). "The elasticity of the packet causes the hammer to rebound, and thus lightens the labor of the operator, and enables him to apply his blows with regular effect" (H). "How the workman manages to beat all the pieces equally, and yet beat none into holes, he alone can answer; it is one of the mysteries of his craft" (A). "When it is recollected that the absolute effect of the average hammer with the average blow is equivalent to the steady pressure of about 2800 pounds to the square inch, there will be seen to be need for discretion in the application of such a force" (I). Now and then, the hammer is laid down and the cutch bent and twisted in both hands — a process called *rifling* (K) — to facilitate the free spreading of the gold leaves (C, E, G, H), and is sometimes taken apart to examine the state of the gold and to exchange the innermost parts of the pack for the outer parts (G, H, I). The beating in the cutch continues for about twenty minutes (J), by which time the gold leaves have thinned and expanded laterally to the size of the pieces of vellum (A).

(*Continued in next issue*)

COMMUNICATIONS

From — MR. W. W. TAYLOR, of the Edison Institute, Dearborn, Mass:

"I was quite interested in an article on the last page of the November Chronicle on old time coffins, by Mr. Seymour, as I have collected quite a number of them for our museum. Mine were found mostly in Hillsboro County, N. H., and in Rockingham. They were all, however, made of pine, painted with "Skim-Milk Red," and fastened with hand-forged nails. I bought the old Hearse House, town hearse, and two very early biers, also of pine, but painted with "Skim-Milk Gray" instead of red, from the old Town of Newton, New Hampshire. In the hearse house were also the tools for digging and measuring graves, all of which we have here. The hearse house has been set up, but the hearse and other things are not yet on exhibition. At Wareham, Mass., I obtained two other hearses, one of which is very early, as it has the old time wooden exe and lynch pins. It was known as "The Old Fish-Cart," because, after the new hearse was bought by the town along in 1850, it is said to have been used to peddle fish from for a while, but they soon got it away from the fish man, and stored it where I found it."

From — MR. E. T. GOODNOW:

"Niles' Weekly Register, of July 3, 1819, states that 'Mr. Silas Mason, of Dedham (probably Mass.) has invented a carding machine, expressly for the manufacture of wool hats. It produces the hat in its conic form, all in one operation.' The same periodical (issue of October 17, 1835) contains the following: 'The march of American manufactures towards perfection is altogether astonishing; Messrs. R. W. Peck & Co., of Brooklyn, have now in operation a machine for manufacturing hats that is perfectly wonderful, and will enable them to undersell everybody in creation, we should think. The material is taken through a box some 60 or 70 feet long, and in its passage the fur is separated from the hair by means of certain complicated machinery and falls like flakes of snow into a reservoir and is then converted into webs that look more like gossamer than anything else. It is then wound like silk from the cocoon and made into hat bodies of any required dimensions; the whole process is not only marvelous, but it is unique, nothing like it in the world, and makes the old mode of making hats look clumsy enough in all conscience.'" [These are extremely interesting items, as showing the early efforts to improve on the laborious processes described in our recent article on hat-making. They could hardly have been as successful as predicted, however, as the authorities uniformly declare that no such machines were in general use until after 1850. — ED.]

From — MR. FRANK K. SWAIN:

"An Englishman travels with 'luggage,' but an American has 'baggage.' Luggage may be several bags and a *'box,'* while baggage consists of bags and 'trunks.' Why trunks, the Englishman asks, when the object is just another form of box? It irritates him because it is so American, but we weren't so Americanized in 1462, when Mann. & Household Exp. quoted 'a new Tronke for my Lord'; 1662 Pepys Diary, 'we were forced to send for a Smith to break open her Trunk'; 1773 Goldsmith's She Stoops to Conquer 'see their horses and trunks taken care of.' Shakespeare, 'Locked up in chests and trunks.'

We use the word every day but do we know what it means? I did not, until 1925, when, on going into the little Parish Church at Dunster, on the edge of the Lorna Doone Country, in Devonshire, England, the janitress came to me and offered to show me something strictly American — as if I had gone four thousand miles for *that* purpose. As far as I know, an American would have to travel that far, to see what I saw. A great log adzed or dressed smooth on the bottom and two sides, but barked, and left round on the top. This round top had been sawed horizontally from the log, and then hinged to it, forming a lid. When the lid was raised, it showed the log hollowed out to a board thinness, forming a great, one-piece box, or, as the janitress explained, a real American *trunk*, made from the *trunk* of a tree — hence the name to this day for a traveling box. An old watering trough for horses is the same thing, more crudely shaped and scooped, but without a lid."

Mr. R. W. G. Vail, Librarian of the American Antiquarian Society, states that the Rochester (N. Y.) Historical Society has recently been presented with an anvil brought to this country by John Moses about 1632, and inquires whether this is the earliest known American anvil.

From — MR. ALLEN EATON:

"In connection with a chapter on baskets which I am including in a manuscript on the Handicrafts of the Southern Highlands, it has occurred to me that it might be helpful to people interested in the subject to have a list of collections of baskets to be seen throughout the country. I do not know of any special collections of baskets of the Southern Highlands, that is, the mountain region of Virginia, West Virginia, North Carolina, South Carolina, Tennessee, Kentucky, northern Georgia, and northeastern Alabama (the area which I am covering in this report), excepting those at a few handicraft centers in that region. However, similar baskets have been made in other parts of our country, and I thought you might know or put me in the way of finding out about some of these collections which could be listed in the book." [We have no information on this subject. Can any other member furnish any? — ED.]